



NOTICE OF UPCOMING COMMITTEE ACTIVITY

FULL COMMITTEE HEARING

TIME

10:00 a.m.

DATE

Wednesday, March 8, 2023

PLACE

2318 Rayburn House Office Building

Subject:

Innovation Through Collaboration: The Department of Energy's Role in the U.S. Research Ecosystem

Witnesses:

- Dr. Harriet Kung, Deputy Director for Science Programs in the Office of Science, the U.S. Department of Energy
- Mr. James L. Reuter, Associate Administrator for the Space Technology Mission Directorate, the National Aeronautics and Space Administration
- Dr. Michael C. Morgan, Assistant Secretary of Commerce for Environmental Observation and Prediction, the National Oceanic and Atmospheric Administration
- Dr. Sean L. Jones, Assistant Director for the Directorate of Mathematical and Physical Sciences, the National Science Foundation

This hearing will serve as a legislative hearing for a series of bills that would strengthen several of the Department of Energy's longstanding interagency research partnerships and codify them in law as appropriate. Attached are discussion drafts of three Science Committee Majority bills under consideration.

Committee on Science, Space, and Technology
2321 Rayburn House Office Building
Washington, DC 20515

[DISCUSSION DRAFT]

118TH CONGRESS
1ST SESSION

H. R. _____

To provide for Department of Energy and National Aeronautics and Space Administration research and development coordination, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M____. _____ introduced the following bill; which was referred to the
Committee on _____

A BILL

To provide for Department of Energy and National Aeronautics and Space Administration research and development coordination, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “**[To Be Supplied]**
5 Act”.

1 **SEC. 2. DEPARTMENT OF ENERGY AND NATIONAL AERO-**
2 **NAUTICS AND SPACE ADMINISTRATION RE-**
3 **SEARCH AND DEVELOPMENT COORDINA-**
4 **TION.**

5 (a) IN GENERAL.—The Secretary of Energy (in this
6 section referred to as the “Secretary”) and the Adminis-
7 trator of the National Aeronautics and Space Administra-
8 tion (in this section referred to as the “Administrator”)
9 shall carry out cross-cutting and collaborative research
10 and development activities focused on the joint advance-
11 ment of Department of Energy and National Aeronautics
12 and Space Administration mission requirements and prior-
13 ities.

14 (b) MEMORANDUM OF UNDERSTANDING.—The Sec-
15 retary and the Administrator shall coordinate the activi-
16 ties under subsection (a) through the establishment of a
17 memorandum of understanding, or other appropriate
18 interagency agreement. Such memorandum or agreement,
19 as the case may be, shall require the use of a competitive,
20 merit-reviewed process, which considers applications from
21 Federal agencies, National Laboratories, institutions of
22 higher education, non-profit institutions, and other appro-
23 priate entities.

24 (c) COORDINATION.—In carrying out the activities
25 under subsection (a), the Secretary and the Administrator
26 may—

1 (1) conduct collaborative research in a variety
2 of focus areas, such as—

3 (A) propulsion systems and components,
4 including nuclear thermal and nuclear electric,
5 for the Moon and Mars, including radioisotope
6 power systems, thermoelectric generators, ad-
7 vanced nuclear fuels, and heater units;

8 (B) modeling and simulation, machine
9 learning, data assimilation, large scale data
10 analytics, and predictive analysis in order to op-
11 timize algorithms for mission-related purposes;

12 (C) fundamental high energy physics, in-
13 cluding regarding dark energy and dark matter,
14 in collaboration with the program authorized
15 under section 305 of the Department of Energy
16 Research and Innovation Act (42 U.S.C.
17 18643);

18 (D) fundamental earth and environmental
19 sciences, including in collaboration with the pro-
20 gram authorized under section 306 of the De-
21 partment of Energy Research and Innovation
22 Act (42 U.S.C. 18644);

23 (E) radiation health effects, including in
24 collaboration with the program authorized
25 under section 306 of the Department of Energy

1 Research and Innovation Act (42 U.S.C.
2 18644);

3 (F) quantum information sciences, includ-
4 ing quantum computing and quantum network
5 infrastructure, including in collaboration with
6 the programs authorized under sections 403
7 and 404 of the National Quantum Initiative Act
8 (15 U.S.C. 8853 and 8854);

9 (G) nanotechnology;

10 (H) scientific observations of the early uni-
11 verse from the Moon;

12 (I) planetary defense from potentially haz-
13 ardous asteroids and near-Earth objects;

14 (J) sensor and satellite development;

15 (K) space situational awareness; and

16 (L) fundamental heliophysics;

17 (2) develop methods to accommodate large vol-
18 untary data sets on space and aeronautical informa-
19 tion on high-performance computing systems with
20 variable quality and scale;

21 (3) promote collaboration, open community-
22 based development, and data and information shar-
23 ing between Federal agencies, National Labora-
24 tories, institutions of higher education, nonprofit in-
25 stitutions, and other appropriate entities by pro-

1 viding the necessary access and secure data and in-
2 formation transfer capabilities; and

3 (4) support research infrastructure as the Sec-
4 retary and Administrator determine necessary.

5 (d) AGREEMENTS.—In carrying out the activities
6 under subsection (a), the Secretary and the Administrator
7 are authorized to—

8 (1) carry out reimbursable agreements between
9 the Department of Energy, the National Aeronautics
10 and Space Administration, and other entities in
11 order to maximize the effectiveness of research and
12 development; and

13 (2) collaborate with other Federal agencies as
14 appropriate.

15 (e) REPORT.—Not later than two years after the date
16 of the enactment of this section, the Secretary and the
17 Administrator shall submit to the Committee on Science,
18 Space, and Technology of the House of Representatives
19 and the Committee on Energy and Natural Resources and
20 the Committee on Commerce, Science, and Transportation
21 of the Senate, a report detailing the following:

22 (1) Interagency coordination between each Fed-
23 eral agency involved in the research and development
24 activities carried out under this section.

1 (2) Potential opportunities to expand the tech-
2 nical capabilities of the Department of Energy and
3 the National Aeronautics and Space Administration.

4 (3) Collaborative research achievements.

5 (4) Areas of future mutually beneficial suc-
6 cesses.

7 (5) Continuation of coordination activities be-
8 tween the Department of Energy and the National
9 Aeronautics and Space Administration.

10 (f) RESEARCH SECURITY.—The activities authorized
11 under this section shall be applied in a manner consistent
12 with subtitle D of title VI of the Research and Develop-
13 ment, Competition, and Innovation Act (enacted as divi-
14 sion B of the CHIPS Act of 2022 (Public Law 117–167;
15 42 U.S.C. 19231 et seq.)).

[DISCUSSION DRAFT]

118TH CONGRESS
1ST SESSION

H. R. _____

To direct the Department of Energy and the National Oceanic and Atmospheric Administration to conduct collaborative research in order to advance numerical weather and climate prediction in the United States, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M____. _____ introduced the following bill; which was referred to the
Committee on _____

A BILL

To direct the Department of Energy and the National Oceanic and Atmospheric Administration to conduct collaborative research in order to advance numerical weather and climate prediction in the United States, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Advanced Weather
5 Model Computing Development Act”.

1 **SEC. 2. DEFINITIONS.**

2 In this Act:

3 (1) DEPARTMENT.—The term “Department”
4 means the Department of Energy.

5 (2) NATIONAL LABORATORY.—The term “Na-
6 tional Laboratory” has the meaning given such term
7 in section 2 of the Energy Policy Act of 2005 (42
8 U.S.C. 15801).

9 (3) SECRETARY.—The term “Secretary” means
10 the Secretary of Energy.

11 (4) ADMINISTRATOR.—The term “Adminis-
12 trator” means the Administrator of the National
13 Oceanic and Atmospheric Administration.

14 **SEC. 3. DEPARTMENT OF ENERGY AND NATIONAL OCEANIC**
15 **AND ATMOSPHERIC ADMINISTRATION RE-**
16 **SEARCH AND DEVELOPMENT COORDINA-**
17 **TION.**

18 (a) IN GENERAL.—The Secretary and Administrator
19 shall carry out collaborative research and development ac-
20 tivities in artificial intelligence and high performance com-
21 puting, focused on the advancement of climate models and
22 operational numerical weather prediction skill to support
23 National Oceanic and Atmospheric Administration mis-
24 sion requirements and the advancement of Department
25 computational and networking capabilities to analyze,
26 model, simulate, and predict complex phenomena.

1 (b) MEMORANDUM OF UNDERSTANDING.—The Sec-
2 retary and Administrator shall carry out the activities
3 under subsection (a) through the establishment of a
4 memorandum of understanding, or other appropriate
5 interagency agreement. Such memorandum or agreement,
6 as the case may be, shall require the use of a competitive,
7 merit-reviewed process, which considers applications from
8 Federal agencies, National Laboratories, institutions of
9 higher education, nonprofit institutions, and other appro-
10 priate entities.

11 (c) ACTIVITIES.—In carrying out the activities under
12 subsection (a), the Secretary and Administrator may—

13 (1) conduct collaborative research in modeling
14 and simulation, machine learning, data assimilation,
15 large scale data analytics, and predictive analysis in
16 order to optimize algorithms for climate modeling
17 and numerical weather prediction;

18 (2) explore options for performance portability
19 of the optimized weather model codes between the
20 operational computing systems of the National Oce-
21 anic and Atmospheric Administration and the De-
22 partment's high performance computers;

23 (3) develop methods to accommodate large data
24 sets on weather and climate information with vari-
25 able quality and scale;

1 (4) collaborate on new approaches and maxi-
2 mize the use of algorithms developed through artifi-
3 cial intelligence, machine learning, data analytics,
4 natural language processing, modeling and simula-
5 tion, with a focus on new algorithms suitable for
6 high performance computing systems and numerical
7 weather prediction or climate models;

8 (5) to the maximum extent practicable, and in
9 compliance with national security policies, promote
10 collaboration, open community-based development,
11 and data sharing between Federal agencies, National
12 Laboratories, institutions of higher education, non-
13 profit institutions, and other appropriate entities by
14 providing the necessary access and secure data
15 transfer capabilities; and

16 (6) support scientific computing infrastructure
17 as the Secretary and Administrator determine ap-
18 propriate.

19 (d) COORDINATION.—In carrying out the activities
20 under subsection (a), the Secretary and Administrator are
21 authorized to—

22 (1) carry out reimbursable agreements between
23 the Department, the National Oceanic and Atmos-
24 pheric Administration, and other entities in order to

1 maximize the effectiveness of research and develop-
2 ment to improve numerical weather prediction; and

3 (2) collaborate with other Federal agencies as
4 appropriate.

5 (e) REPORT.—Not later than two years after the date
6 of the enactment of this Act, the Secretary and Adminis-
7 trator shall submit to the Committee on Science, Space,
8 and Technology of the House of Representatives, and the
9 Committee on Commerce, Science, and Transportation
10 and the Committee on Energy and Natural Resources of
11 the Senate, a report detailing the following:

12 (1) Interagency coordination between each Fed-
13 eral agency involved in the research and development
14 activities carried out under this section.

15 (2) Potential opportunities to expand the tech-
16 nical capabilities of the Department and the Na-
17 tional Oceanic and Atmospheric Administration.

18 (3) Collaborative research achievements.

19 (4) Areas of future mutually beneficial gains by
20 such activities.

21 (5) Continuation of coordination between the
22 Department and the National Oceanic and Atmos-
23 pheric Administration.

1 **SEC. 4. CLIMATE AND WEATHER PREDICTION ON HIGH**
2 **PERFORMANCE COMPUTERS INITIATIVE.**

3 (a) IN GENERAL.—The Secretary and Administrator
4 shall carry out an initiative to run advanced model code,
5 including climate and operational weather models, on the
6 Department high performance computers in order to con-
7 duct proof of concept scenarios and comparison to current
8 issued forecasts and models. The Secretary and Adminis-
9 trator shall carry out such initiative through a competitive,
10 merit-reviewed process, and consider applications from
11 Federal agencies, National Laboratories, institutions of
12 higher education, nonprofit institutions, and other appro-
13 priate entities.

14 (b) COMPONENTS.—In carrying out the initiative
15 under subsection (a), the Secretary and Administrator
16 shall prevent duplication and coordinate research efforts
17 in artificial intelligence, high performance computing,
18 modeling and simulation, machine learning, and data as-
19 simulation across the Department, and may—

20 (1) run real-time weather forecast scenarios to
21 conduct comparative research on National Weather
22 Service issued forecasts to forecasts issued through
23 the use of operational models run on high perform-
24 ance computers;

25 (2) share relevant modeling system and applica-
26 tions innovations developed through such initiative,

1 including Unified Forecast System-based applica-
2 tions, through community-based activities; and

3 (3) leverage related weather and climate efforts
4 and data from the National Science and Technology
5 Council and the Interagency Council for Advancing
6 Meteorological Services.

7 (c) REPORT.—Not later than two years after the date
8 of the enactment of this Act, the Secretary and Adminis-
9 trator shall submit to the Committee on Science, Space,
10 and Technology of the House of Representatives and the
11 Committee on Commerce, Science, and Transportation
12 and the Committee on Energy and Natural Resources of
13 the Senate a report evaluating the following:

14 (1) The effectiveness of the initiative under sub-
15 section (a), including applied research discoveries
16 and operational weather prediction improvements
17 achieved.

18 (2) Potential opportunities to expand the tech-
19 nical capabilities of the Department and the Na-
20 tional Oceanic and Atmospheric Administration
21 through the development of artificial intelligence and
22 data analytics technologies.

23 (d) SUNSET.—The authority under this section shall
24 terminate five years after the date of the enactment of
25 this section.

1 **SEC. 5. RESEARCH SECURITY.**

2 The activities authorized under this Act shall be ap-
3 plied in a manner consistent with subtitle D of title VI
4 of the Research and Development, Competition, and Inno-
5 vation Act (enacted as division B of the CHIPS Act of
6 2022 (Public Law 117–167; 42 U.S.C. 19231 et seq.)).

[DISCUSSION DRAFT]

118TH CONGRESS
1ST SESSION

H. R. _____

To provide for Department of Energy and Department of Agriculture joint research and development activities, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M____. _____ introduced the following bill; which was referred to the
Committee on _____

A BILL

To provide for Department of Energy and Department of Agriculture joint research and development activities, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “**【To Be Supplied】**
5 Act”.

1 **SEC. 2. DEPARTMENT OF ENERGY AND DEPARTMENT OF**
2 **AGRICULTURE JOINT RESEARCH AND DEVEL-**
3 **OPMENT ACTIVITIES.**

4 (a) IN GENERAL.—The Secretary of Energy and the
5 Secretary of Agriculture (in this section referred to as the
6 “Secretaries”) shall carry out cross-cutting and collabo-
7 rative research and development activities focused on the
8 joint advancement of Department of Energy and Depart-
9 ment of Agriculture mission requirements and priorities.

10 (b) MEMORANDUM OF UNDERSTANDING.—The Sec-
11 retaries shall carry out and coordinate the activities under
12 subsection (a) through the establishment of a memo-
13 randum of understanding, or other appropriate inter-
14 agency agreement. Such memorandum or agreement shall
15 require the use of a competitive, merit-reviewed process,
16 which considers applications from Federal agencies, Na-
17 tional Laboratories, institutions of higher education, non-
18 profit institutions, and other appropriate entities.

19 (c) COORDINATION.—In carrying out the activities
20 under subsection (a), the Secretaries may—

21 (1) conduct collaborative research over a variety
22 of focus areas, such as—

23 (A) modeling and simulation, machine
24 learning, artificial intelligence, data assimila-
25 tion, large scale data analytics, and predictive
26 analysis in order to optimize algorithms for

1 purposes related to agriculture and energy,
2 such as life cycle analysis of agricultural or en-
3 ergy systems;

4 (B) fundamental agricultural, biological,
5 computational, and environmental science and
6 engineering, including advanced crop science,
7 crop protection, and breeding, including in col-
8 laboration with the program authorized under
9 section 306 of the Department of Energy Re-
10 search and Innovation Act (42 U.S.C. 18644);

11 (C) integrated natural resources and the
12 energy-water nexus, including in collaboration
13 with the program authorized under section
14 1010 of the Energy Act of 2020 (enacted as di-
15 vision Z of the Consolidated Appropriations
16 Act, 2021 (42 U.S.C. 16183));

17 (D) advanced biomass, biobased products,
18 and biofuels, including in collaboration with the
19 activities authorized under section 9008(b) of
20 the Farm Security and Rural Investment Act of
21 2002 (7 U.S.C. 8108(b));

22 (E) diverse feedstocks for economically and
23 environmentally sustainable fuels, including
24 aviation and naval fuels;

1 (F) colocation of agricultural resources and
2 activities and ecosystem services with diverse
3 energy technologies and resources, such as geo-
4 thermal energy, nuclear energy, solar energy,
5 wind energy, natural gas, hydropower, and en-
6 ergy storage;

7 (G) colocation of agricultural resources
8 and activities with carbon storage and utiliza-
9 tion technologies;

10 (H) invasive species management to fur-
11 ther the work done by the Federal Interagency
12 Committee for the Management of Noxious and
13 Exotic Weeds;

14 (I) long-term and high-risk technological
15 barriers in the development of transformative
16 science and technology solutions in the agri-
17 culture and energy sectors, including in collabo-
18 ration with the program authorized under sec-
19 tion 5012 of the America COMPETES Act (42
20 U.S.C. 16538);

21 (J) grid modernization and grid security;
22 and

23 (K) rural technology development, includ-
24 ing manufacturing, precision agriculture tech-

1 nologies, and mechanization and automation
2 technologies;

3 (2) develop methods to accommodate large vol-
4 untary standardized and integrated data sets on ag-
5 ricultural, environmental, supply chain, and eco-
6 nomic information with variable accuracy and scale;

7 (3) promote collaboration, open community-
8 based development, and data and information shar-
9 ing between Federal agencies, National Labora-
10 tories, institutions of higher education, nonprofit in-
11 stitutions, industry partners, and other appropriate
12 entities by providing reliable access to secure data
13 and information that are in compliance with Federal
14 rules and regulations; and

15 (4) support research infrastructure and work-
16 force development as the Secretary and Adminis-
17 trator determine necessary

18 (d) AGREEMENTS.—In carrying out the activities
19 under subsection (a), the Secretaries are authorized to—

20 (1) carry out reimbursable agreements between
21 the Department of Energy, the Department of Agri-
22 culture, and other entities in order to maximize the
23 effectiveness of research and development; and

24 (2) collaborate with other Federal agencies as
25 appropriate.

(e) REPORT.—Not later than two years after the date of the enactment of this Act, the Secretaries shall submit to the Committee on Science, Space, and Technology and the Committee on Agriculture of the House of Representatives, and the Committee on Energy and Natural Resources and the Committee on Agriculture, Nutrition, and Forestry of the Senate, a report detailing the following:

(1) Interagency coordination between each Federal agency involved in the research and development activities carried out under this section.

(2) Potential opportunities to expand the technical capabilities of the Department of Energy and the Department of Agriculture.

(3) Collaborative research achievements.

(4) Areas of future mutually beneficial successes.

(5) Continuation of coordination activities between the Department of Energy and the Department of Agriculture.

(f) RESEARCH SECURITY.—The activities authorized under this section shall be applied in a manner consistent with subtitle D of title VI of the Research and Development, Competition, and Innovation Act (enacted as division B of the CHIPS Act of 2022 (Public Law 117–167; 42 U.S.C. 19231 et seq.)).